

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)

REC'D 28 FEB 2006

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(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2050030KC	<b>FOR FURTHER ACTION</b>		See Form PCT/IPEA/416
International application No. PCT/SG2005/000061	International filing date ( <i>day/month/year</i> ) 1 March 2005	Priority date ( <i>day/month/year</i> ) 15 March 2004	
<p>International Patent Classification (IPC) or national classification and IPC</p> <p>Int. Cl.</p> <p><b>H01L 33/00 (2006.01)</b></p>			
<p>Applicant</p> <p>TINGGI TECHNOLOGIES PRIVATE LIMITED et al</p>			

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 3 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of 1 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>																									
<p>4. This report contains indications relating to the following items:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;"><input checked="" type="checkbox"/></td> <td style="width: 15%; padding: 2px;">Box No. I</td> <td style="width: 70%; padding: 2px;">Basis of the report</td> </tr> <tr> <td style="width: 15%; padding: 2px;"><input type="checkbox"/></td> <td style="width: 15%; padding: 2px;">Box No. II</td> <td style="width: 70%; padding: 2px;">Priority</td> </tr> <tr> <td style="width: 15%; padding: 2px;"><input type="checkbox"/></td> <td style="width: 15%; padding: 2px;">Box No. III</td> <td style="width: 70%; padding: 2px;">Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="width: 15%; padding: 2px;"><input type="checkbox"/></td> <td style="width: 15%; padding: 2px;">Box No. IV</td> <td style="width: 70%; padding: 2px;">Lack of unity of invention</td> </tr> <tr> <td style="width: 15%; padding: 2px;"><input checked="" type="checkbox"/></td> <td style="width: 15%; padding: 2px;">Box No. V</td> <td style="width: 70%; padding: 2px;">Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="width: 15%; padding: 2px;"><input type="checkbox"/></td> <td style="width: 15%; padding: 2px;">Box No. VI</td> <td style="width: 70%; padding: 2px;">Certain documents cited</td> </tr> <tr> <td style="width: 15%; padding: 2px;"><input type="checkbox"/></td> <td style="width: 15%; padding: 2px;">Box No. VII</td> <td style="width: 70%; padding: 2px;">Certain defects in the international application</td> </tr> <tr> <td style="width: 15%; padding: 2px;"><input type="checkbox"/></td> <td style="width: 15%; padding: 2px;">Box No. VIII</td> <td style="width: 70%; padding: 2px;">Certain observations on the international application</td> </tr> </table>		<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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<p>Date of submission of the demand 9 January 2006</p> <p>Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929</p>	<p>Date of completion of this report 16 February 2006</p> <p>Authorized Officer <b>S. T. PRING</b> Telephone No. (02) 6283 2210</p>
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## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SG2005/000061

## Box No. I Basis of the report

1. With regard to the language, this report is based on:

The international application in the language in which it was filed

A translation of the international application into , which is the language of a translation furnished for the purposes of:

- international search (under Rules 12.3(a) and 23.1 (b))
- publication of the international application (under Rule 12.4(a))
- international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

the international application as originally filed/furnished

the description:

pages 1-13 as originally filed/furnished

pages\* received by this Authority on with the letter of

pages\* received by this Authority on with the letter of

the claims:

pages 14-19 as originally filed/furnished

pages\* as amended (together with any statement) under Article 19

pages\* 20 received by this Authority on 9 January 2006 with the letter of 27 December 2005

pages\* received by this Authority on with the letter of

the drawings:

pages 1/7-7/7 as originally filed/furnished

pages\* received by this Authority on with the letter of

pages\* received by this Authority on with the letter of

a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3.  The amendments have resulted in the cancellation of:

- the description, pages
- the claims, Nos.
- the drawings, sheets/figs
- the sequence listing (*specify*):
- any table(s) related to the sequence listing (*specify*):

4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- the description, pages
- the claims, Nos.
- the drawings, sheets/figs
- the sequence listing (*specify*):
- any table(s) related to the sequence listing (*specify*):

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SG2005/000061

<b>Box No. V</b>	<b>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</b>	
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## 1. Statement

Novelty (N)	Claims 1-53	YES
	Claims	NO
Inventive step (IS)	Claims 1-53	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-53	YES
	Claims	NO

## 2. Citations and explanations (Rule 70.7)

Novelty and Inventive Step

WO 2001/047039 LUMILEDS LIGHTING US LLC

US 6 627 921 WONG et al

US 6 821 804 THIBEAULT et al

WO 2004/102686 CREE INC

JP 2001-168387 TOYODA GOSEI CO LTD

The above art describe the removal of the substrate but it is always replaced by another layer. They disclose a reflecting layer but it is disposed on the textured surface of the substrate which is contained in the middle of the device, not on the bottom or it is without the substrate. Therefore the removal of the substrate and the patterning of the epitaxial layers thus revealed, with a reflecting ohmic layer on the top surface of the epitaxial layers can be said to novel and to have an inventive step.

50. A semiconductor device as claimed in any one of claims 43 to 49, wherein the thermally conductive metal is copper and the epitaxial layers comprise multiple GaN-related epitaxial layers.
- 5 51. A semiconductor device as claimed in any one of claims 43 to 50, wherein the semiconductor device is selected from the group consisting of: a light emitting device, and a transistor device.
- 10 52. A semiconductor device as claimed in any one of claims 43 to 50, wherein the second ohmic contact layer is selected from the group consisting of: blank, and patterned.
- 15 53. A semiconductor device fabricated by the method of any one of claims 1 to 42.